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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

FEELY, MICHAEL J

ART UNIT

PAPER NUMBER

1796

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DELIVERY MODE

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 09/636,571	<b>Applicant(s)</b> NAKAMURA ET AL.	
	<b>Examiner</b> Michael J. Feely	<b>Art Unit</b> 1796	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 09 November 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 66-78,80-85,87-90,99,100 and 102-148 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 66-78,80-85,87-90,99,100 and 102-148 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 August 2000 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>20071226</u> .  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Pending Claims***

Claims 66-78, 80-85, 87-90, 99, 100, and 102-148 are pending.

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on November 9, 2007 has been entered.

### ***Response to Amendment***

2. The objection to claim 100 has been overcome by amendment.
3. The objection to claims 92-94 has been rendered moot by the cancellation of these claims.
4. The rejection of claims 55 and 57-65 under 35 U.S.C. 103(a) as being unpatentable over Scheve et al. (US Pat. No. 4,717,643) has been rendered moot by the cancellation of these claims.

### ***Drawings***

5. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: **102** (of Figure 2).

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Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Discussion of the Inventive Concept***

6. The inventive concept of the instant invention relates to a highly stable resin (*and method of producing said resin*) without the risk of bringing about undesired increase of the molecular weight or the viscosity in storage, use, or handling (*see page 1 of the Specification*). This highly stable resin comprises a polymer obtained by reacting: (a) a material polymer having a principle chain including (a<sub>1</sub>) at least a component unit having an acid functional group and (a<sub>2</sub>) a component unit having a hydroxyl group; and (b) an isocyanate compound. This reaction product is subsequently reacted with an alcohol (*see paragraph bridging pages 11 and 12 of the Specification*).

More specifically, the first reaction involves amido-bonding of the isocyanate with at least a part of the acidic functional group via an isocyanate group of the isocyanate compound and/or urethane-bonding of the isocyanate with at least a part of the hydroxyl group via an

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isocyanate group of the isocyanate compound (*see top of page 13 of the Specification*). The first reaction also involves dehydration of the un-reacted acidic functional groups, yielding acid anhydride groups (*see page 12 of the Specification*). The subsequent reaction is the key to the invention, which involves **ester-bonding** of alcohol with the acid anhydride groups via a hydroxyl group of the alcohol (*see top of page 13 of the Specification*). This subsequent reaction consumes the acid anhydride groups (*dehydrated un-reacted acidic functional groups*), preventing these anhydride groups from ester-bonding and cross-linking with the other polymer molecules during storage, use, or handling. It is this ester-bonding and cross-linking that leads to the undesired increase of the molecular weight and viscosity; hence, this subsequent **ester-bonding** reaction is instrumental in preventing these undesired increases (*see page 12 of the Specification*).

***Claim Rejections - 35 USC § 112, 1<sup>st</sup> paragraph***

7. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

8. Claims 66-78, 80-85, 87-90, 99, 100, and 102-148 are rejected under 35 U.S.C. 112, first paragraph, as based on a disclosure which is not enabling. The second step of: adding an alcohol to said reaction product and thereby reacting said alcohol with acid anhydride groups of said reaction product, wherein said acid anhydride groups are generated during said first reaction by dehydration of un-reacted acidic groups is critical or essential to the practice of the

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invention, but not included in the claim(s). Such omission is not enabled by the disclosure. See *In re Mayhew*, 527 F.2d 1229, 188 USPQ 356 (CCPA 1976).

As discussed above in section 5, the key process step of producing the instantly claimed highly stable polymer involves **ester-bonding** of alcohol with the acid anhydride groups via a hydroxyl group of the alcohol. This subsequent reaction consumes the acid anhydride groups (*dehydrated un-reacted acidic functional groups*), preventing these anhydride groups from ester-bonding and cross-linking with the other polymer molecules during storage, use, or handling.

Independent claims 103, 104, 106, and 142, disclose the *reaction* of alcohol with the reaction product; however, they are silent regarding the essential reaction specifics of: *adding an alcohol to said reaction product and thereby reacting said alcohol with acid anhydride groups of said reaction product, wherein said acid anhydride groups are generated during said first reaction by dehydration of un-reacted acidic groups*. Independent claims 66, 99, 100, 105, and 132 disclose the mere *addition* of alcohol to the reaction product. Furthermore, they are silent regarding the essential *reaction* specifics.

9. Claims 66, 70-78, 80-85, 99, 100, 103, 104, 107-130, and 132-148 are rejected under 35 U.S.C. 112, first paragraph, as based on a disclosure which is not enabling. *The addition/reaction of alcohol with the reaction product solution before viscosity rise of the solution or before completion of viscosity rise of the solution is critical or essential to the practice of the invention, but not included in the claim(s). Such an omission is not enabled by the disclosure. See *In re Mayhew*, 527 F.2d 1229, 188 USPQ 356 (CCPA 1976).*

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As discussed above in section 5, the key process step of producing the instantly claimed highly stable polymer involves **ester-bonding** of alcohol with the acid anhydride groups via a hydroxyl group of the alcohol. This subsequent reaction consumes the acid anhydride groups (*dehydrated un-reacted acidic functional groups*), preventing these anhydride groups from ester-bonding and cross-linking with the other polymer molecules during storage, use, or handling. It is this ester-bonding and cross-linking that leads to the undesired increase of the molecular weight and viscosity; hence, the timing of this subsequent **ester-bonding** reaction with alcohol is instrumental in preventing these undesired increases.

10. Claims 99, 100, 102-104, are 107-148 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Independent claims 99, 100, 103, 104, 132, and 142 disclose a highly stably polymer *obtainable* by the claimed (*and above-discussed*) process. The scope of these claims is open to *methods* other than the one set forth in the specification and the original claims. However, the specification fails to shed light on, or even consider, any *other methods* of preparing said highly stable polymer. Therefore, the specification and the original claims only support a highly stable polymer **obtained** by the claimed (*and above-discussed*) process because this process is described as essential to providing said high stability.

***Claim Rejections - 35 USC § 112, 2<sup>nd</sup> paragraph***

11. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

12. Claims 66-78, 80-85, 87-90, 99, 100, and 102-148 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential steps, such omission amounting to a gap between the steps. See MPEP § 2172.01. The omitted steps are: *see section 7 above*.

13. Claims 66, 70-78, 80-85, 99, 100, 103, 104, 107-130, and 132-148 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential steps, such omission amounting to a gap between the steps. See MPEP § 2172.01. The omitted steps are: *see section 8 above*.

***Claim Rejections - 35 USC § 102/103***

14. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

15. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.



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16. Claims 66-75, 80-82, 87, 99, 100, 102-112, 116-121, 125-127, and 131 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Rosenkranz et al. (GB 1,384,343).

Regarding claims 66-75, 80-82, 87, 100, 102, 103, 105, 106, and 116-121, Rosenkranz et al. disclose the instantly claimed polymer starting material, wherein the polymer starting material is formed by monomers corresponding to formula (2) *see claim for structure* (page 3, left column, lines 12-19; Example 1) and other monomers, such as styrene (page 3, left column, lines 12-19; page 2, left column, lines 35-43) and monomers corresponding to formula (1) *see claim for structure* (page 3, left column, lines 12-19; page 2, left column, lines 35-43; Example 1). The reaction of these monomers takes place in the presence of a peroxide initiator (Example 1). This polymer starting material is reacted with an isocyanate compound until the isocyanate groups are fully consumed (page 3, left column, lines 19-38). Furthermore, to improve storage stability, *phenol derivatives* or *other solvents* may be added to the reaction product (page 3, right column, lines 82-90).

As described by applicant, it is assumed that un-reacted acidic groups of the polymer starting material are converted to anhydride groups during the isocyanate reaction step. Furthermore, through the addition of *phenol derivatives (alcohols)*, an ester-bonding reaction would have inherently taken place. Hence, the claims are inherently satisfied by the teachings of Rosenkranz et al.

Alternatively, the *other solvents* used by Rosenkranz et al. to improve storage stability include “higher alcohols” (page 3, right column line 82 through page 4, left column, line 4). Again, through the addition of the *higher alcohol*, an ester-bonding reaction would have

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inherently taken place. Therefore, the claims are obviously satisfied by the teachings of Rosenkranz et al. because they disclose the use of *other solvents* to improve storage stability, wherein the list of contemplated *other solvents* includes *higher alcohols*.

Further regarding claims 74, 75, 120, and 121, Rosenkranz et al. fail to explicitly disclose the instantly claimed property limitation. However, it appears that this property limitation would have been inherently taught by the prior art because Rosenkranz et al. satisfy all of the material/chemical limitations of the instant invention.

In light of this, it has been found that, “Products of identical chemical composition can not have mutually exclusive properties.” A chemical composition and its properties are inseparable. Therefore, if the prior art teaches the identical chemical structure, the properties applicant discloses and/or claims are necessarily present – *In re Spada*, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990).

Regarding claims 99, 104, 107-112, 125-127, and 131, the teachings of Rosenkranz et al. are as set forth above and incorporated herein. They fail to explicitly disclose the instantly claimed (low) amounts of anhydride. However, it appears that these anhydride limitations would have been inherently satisfied by prior art. Again, through the addition of the *phenol derivative* or *higher alcohol*, an ester-bonding reaction would have inherently taken place, eliminated any anhydride groups.

### ***Claim Rejections - 35 USC § 103***

17. Claims 76-78, 83-85, 88-90, 113-115, 122-124, 128-130, and 132-148 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rosenkranz et al. (GB 1,384,343).

Regarding claims 76-78, 83-85, 88-90, 113-115, 122-124, 128-130, 139-141, and 146-148, the teachings of Rosenkranz et al. are as set forth above and incorporated herein. As discussed above, they add a *phenol derivative* after the isocyanate reaction. Hence, they fail to disclose the presence of this material *during* the isocyanate reaction. However, it has been found that a change in sequence of adding ingredients is *prima facie* obvious in the absence of unexpected results - *see MPEP 2144.04 IV. C*.

Therefore, the instantly claimed sequence of adding the *phenol derivative* to the reaction product would have been obvious because it has been found that a change in sequence of adding ingredients is *prima facie* obvious in the absence of unexpected results.

Regarding claims 132-138 and 142-145, the teachings of Rosenkranz et al. are as set forth above and incorporated herein. They fail to disclose the instantly claimed *amount* of alcohol; however, one of ordinary skill would have recognized this as a result effective variable, particularly since Rosenkranz et al. add this material to impart storage stability. In light of this, it has been found that, “[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation,” – *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955); and “A particular parameter must first be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation,” – *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use the instantly claimed amount of alcohol in process and product of Rosenkranz et

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al. because: (a) this is identified as a result effective variable having a shelf-stabilizing effect; and (b) it is not inventive to discover optimum or workable ranges by routine experimentation.

### ***Conclusion***

18. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Ueda et al. (US Pat. Nos. 6,432,614 & 6,558,858) disclose a similar polymer; however, they are silent regarding ester bonds formed by reacting an alcohol with acid anhydride groups (*dehydrated un-reacted acidic functional groups*). Noel (US Pat. No. 3,642,943) also discloses a similar copolymer; however, he fails to teach or suggest a stabilized material with ester bonds formed by reacting an alcohol with acid anhydride groups (*dehydrated un-reacted acidic functional groups*). The addition of an *active hydrogen-containing* material leads to a *crosslinked* product, which would cause his copolymer to lose its structural identity.

***Communication***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael J. Feely whose telephone number is (571)272-1086. The examiner can normally be reached on M-F 8:30 to 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Harold Y. Pyon can be reached on 571-272-1498. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Michael J Feely/  
Primary Examiner, Art Unit 1796

June 16, 2008